The Health of Ocean and Coastal Waters

Coastal and Oceans Month--January 2003

Year of Clean Water 2002-2003

Outline

- Oceans and Coasts
- Actions
- Problems
- Remaining Challenges
- Take Home Message

Oceans and Coasts

- Provide recreational opportunities.
- Create one out of every 6 jobs in the US.
- Provide habitat for 75-90% commercial and recreational fish catch.
- Provide aesthetic value.
- Have 180 million Americans visit every year: $600 billion annually.

Actions

- Clean Water Act – 1970
- Marine Protection, Research, and Sanctuaries Act – 1972
- Coastal Zone Management Act - 1973
- Ocean Dumping Ban Act - 1988 - Stopped dumping of industrial waste & sewage sludge
- London Convention - 1972 - Controls ocean dumping of wastes
- MARPOL Treaty - Controls vessel discharges
- Basel Convention - Transboundary movement of wastes

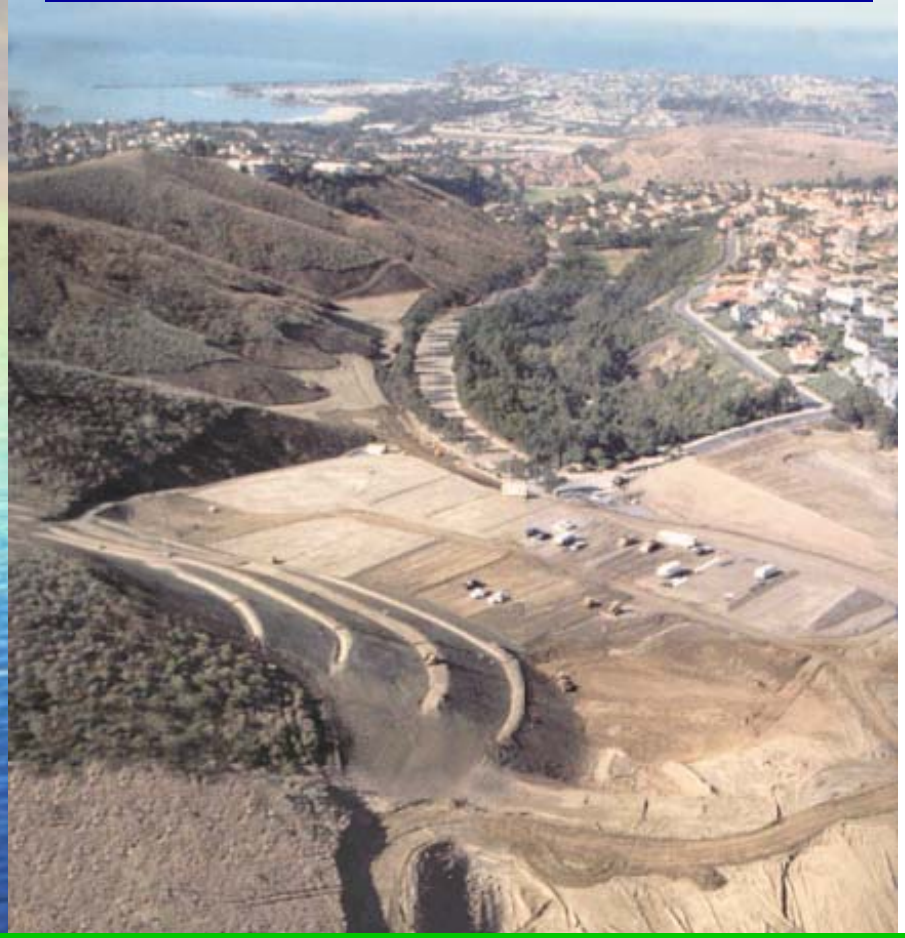
Actions

- Drastic reductions in industrial and municipal pollution.
- Today--170 million people are served by sewage treatment. 1970--85 million.
- Industries installed best available technologies-removing billions of pounds of pollutants from their wastewater.
- The loss of wetlands has slowed.

Problems

- Habitat loss
- Nutrient pollution
- Toxic chemicals
- Pathogens
- Altered water flow
- Invasive species
- Marine debris
- Unsustainable fishing
- Health of Coral Reefs

Habitat Loss



Coastal areas provide habitat for 45% of endangered/threatened species and 50% of non-game migratory birds.

Causes:

- Residential, agricultural and commercial development
- Alteration of water flows (dams, levees, filling of wetlands)
- Shoreline stabilization structures (sea walls, bulkheads, jetties)
- Impacts from certain fishing practices (trawling, long lining)

Effects:

- Declines in fish and wildlife populations
- Increased risk to threatened and endangered species
- Reduced biodiversity (number of species)
- Reduced commercial fish catches
- Reduced opportunities for recreation, education, and tourism

Coastal Habitats

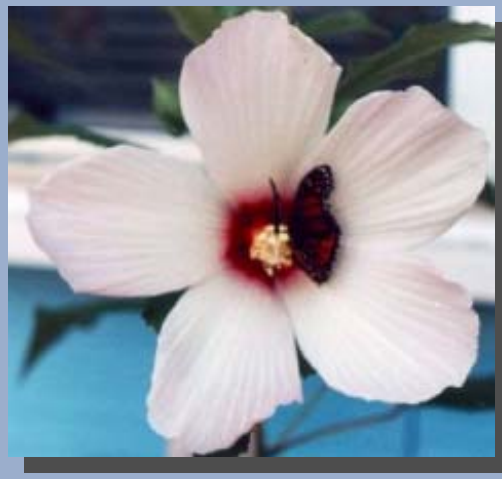
rocky shores

marshes

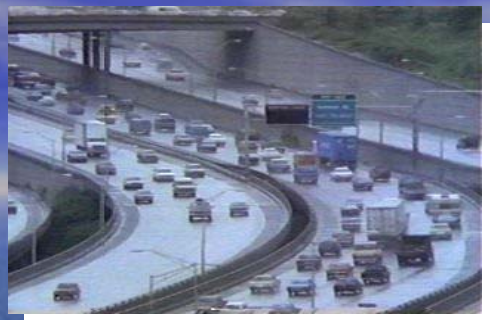
sandy

underwater grasses

Estuaries are home to many kinds of plants and animals.



Nutrient Pollution



Causes:

- Agricultural runoff (fertilizers and animal wastes)
- Urban and suburban runoff
- Sewage treatment plants
- Septic systems
- Deposition of air pollutants on land and water

Effects:

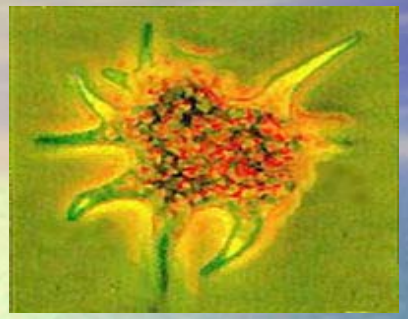
- Stimulates harmful algal blooms
- Reduces water clarity
- Reduces oxygen in the water
- Negative impacts on fish, shellfish, sea-grasses
- Economic losses from reduced fish catches and lost tourism
- 2/3 of estuaries in U.S. are eutrophic

Non-Point Sources of Pollutants

The Dead Zone in the Gulf of Mexico

- Large Zone of Hypoxia - not enough oxygen to support fish and other organisms
  - Size ranges from 3000 to 8000 sq. mi. off the northern coast of the Gulf of Mexico
- Primarily caused by:
  - Nitrogen over-enrichment from the Mississippi & Atchafalaya Rivers
  - Physical changes to the Mississippi & Atchafalaya Rivers
- Problem is not unique to the Gulf of Mexico

Pfiesteria



Amoeba Stage

- Killed over a billion fish in late 1990s.
- Present in sediments from New Jersey to Texas.
- Human health impacts: short term memory loss, confusion, cognitive impairment

Zoospore Stage

Red Tide

Toxic Chemicals

Causes:

- Urban/suburban runoff (oil, paints, lawn-care products, household chemicals, metals)
- Agricultural runoff (pesticides)
- Atmospheric deposition (e.g., waste incineration, fuel combustion)
- Oil spills
- Industrial and municipal discharges
- Vessel discharges

Effects:

- Toxic to fish and wildlife
- Human health risks from swimming and eating contaminated shellfish
- Economic losses from closed shellfish beds and lost tourism